REMARKS

Reconsideration and allowance of the present application based on the following remarks are respectfully requested.

Claims 1-23 are pending in the application.

Claims 1-5, 7 and 10-13 have been amended to conform with U.S. practice and custom. No new matter has been introduced.

CONCLUSION

In view of the foregoing, an early action on the merits is hereby solicited. If the Examiner feels a personal or telephone interview is necessary, he is kindly requested to contact the undersigned at the telephone number listed below.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached Appendix is captioned **"Version with markings to show changes made"**.

Respectfully submitted,
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Enclosure: Appendix

APPENDIX

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

Please amend the specification as follows:

Page 1, paragraph beginning at line 16, is amended as follows:

An optical head is constructed such that, when data are recorded, a recording surface of an optical disc is irradiated with a laser beam having a plurality of predetermined light intensities so as to change the structure of the recording surface of the optical disc, thereby forming recording marks having a plurality of different [reflectance] reflectances so as to record the data.

Page 2, paragraph beginning at line 14, is amended as follows:

As shown in FIGS. 10A and 10B, an optical head 900 includes a base 901. Arranged within the base 901 is a laser diode 91 emitting a laser beam of a predetermined wavelength. The laser beam emitted from the laser diode 91 is reflected from the recording surface of an optical disc and the reflected light is received by a light detector 92. [These] The laser diode 91 and the light detector 92 collectively form an IOU (Integrated Optical Unit) 90. Also arranged within the base 901 are a beam splitter 93 arranged on the optical path of the laser beam emitted from the laser diode 91 of the IOU 90, a collimator 95 for converting the laser beam passing through the beam splitter 93 into a parallel light, a mirror block 96 for reflecting the laser beam collimated by the collimator 95 in a direction of right angles, and an objective lens 97 for collecting the laser beam reflected from the mirror block 96 on a predetermined position of a recording surface of the optical disc. Also arranged is a lens 94 for collecting the laser beam reflected in a direction of right angles from the laser beam running toward the collimator 95 on a light receiving surface of the light detector 92. It follows that an optical path for irradiating an optical disc in a predetermined position with a laser beam is formed between the laser diode 91 (IOU) and the objective lens 97.

Page 3, paragraph beginning at line 19, is amended as follows:

Specifically, the laser diode 91 is operated on the basis of the driving signal generated from the laser driving circuit member 98. The laser beam emitted from the laser diode 91 is incident on the beam splitter 93. A predetermined proportion of the laser beam incident on the beam splitter 93 passes through the beam splitter 93 so as to be guided to the mirror block 96. The beam guided to the mirror block 96 is reflected toward the objective lens 97 so as to

be collected on [as] a predetermined position on the recording surface of an optical disc D. On the other hand, that portion of the laser beam which is incident on the beam splitter 93 and is not reflected toward the mirror block 96 is reflected toward the monitor light detector 92.

Page 5, paragraph beginning at line 17, is amended as follows:

Also, since the optical disc of a DVD type has been put to a practical use, it is desired that the recording of data on optical discs such as a CD-R and a CD-DW capable of reproducing a CD disc for music or capable of recording data with a CD type optical disc be performed in a single optical disc in an optical disc apparatus capable of reproducing a DVD type optical disc. Under the circumstances, the optical head is required to be further miniaturized and to be made [further thin] thinner.

Page 6, paragraph beginning at line 2, is amended as follows:

An object of the present invention is to provide a miniaturized optical head capable of overcoming the restriction in the mounting layout of parts and suitable for [the] mounting in a thin optical disc apparatus.

Page 6, paragraph beginning at line 7, is amended as follows:

Another object of the present invention is to provide an optical head, which can be housed in a thin optical disc apparatus, the optical head being capable of reproducing a DVD disc and a CD disc, and capable of recording data in optical discs in which data can be recorded such as a CD-R disc and a CD-RW disc.

Page 7, paragraph beginning at line 15, is amended as follows:

According to a second aspect of the present invention, there is provided an optical head used in an optical disc apparatus in which an optical disc is irradiated with a light beam for recording data in the optical disc or for reproducing data from the optical disc, at least one of a circuit member and [part] an element for reproducing or recording data being housed in the optical head, comprising:

Page 8, paragraph beginning at line 11, is amended as follows:

a light source driving circuit member which [comprised] comprises the light source driving circuit for driving the light source;

Page 8, paragraph beginning at line 14, is amended as follows:

a signal processing circuit member which [comprised] comprises the signal processing circuit for processing the electric signal from the light receiving element;

Page 8, paragraph beginning at line 17, is amended as follows:

a driving mechanism driving circuit [member] for driving the driving mechanism; and

Page 8, paragraph beginning at line 19, is amended as follows:

a holding member for holding at least one of the [been] driving circuit member, the light source driving circuit member, the signal processing circuit member, and the driving mechanism driving circuit member within the open portion of the base in parallel manner to the optical path within the base and in a manner not to interfere with the optical path within the base.

Page 11, paragraph beginning at line 3, is amended as follows:

FIG. 5 schematically shows [the state that] an embodiment of the present invention where a laser driving circuit member is set on the base as viewed from the rear side, which is shown in FIG. 3;

Page 11, paragraph beginning at line 8, is amended as follows:

FIG. 7 is a plan view schematically showing [the state that the] an embodiment of the present invention where base shown in FIGS. 2 to 6 is incorporated in a motor base of an optical disc apparatus;

Page 11, paragraph beginning at line 12, is amended as follows:

FIG. 8 schematically explains [the state that] an embodiment of the present invention where the motor base shown in FIG. 7 is assembled with the optical disc apparatus;

Page 11, paragraph beginning at line 15, is amended as follows:

FIG. 9A is a plan view showing [the state that] an embodiment of the present invention where an optical head differing from the optical head shown in FIGS. 1A and 1B is observed in a direction parallel to the recording surface of the optical disc;

Page 11, paragraph beginning at line 19, is amended as follows:

FIG. 9B is a side view showing [the state that] an embodiment of the present invention where the optical head shown in FIG. 9A is observed in a direction perpendicular to the recording surface of the optical disc;

Page 11, paragraph beginning at line 23, is amended as follows:

FIG. 10A is a plan view showing [the state that] an embodiment of the present invention where the optical head applied to a known large optical disc apparatus is observed in a direction parallel to the recording surface of the optical disc;

Page 11, paragraph beginning at line 27, is amended as follows:

FIG. 10B is a side view showing [the state that] an embodiment of the present invention where the optical head shown in FIG. 10A is observed in a direction perpendicular to the recording surface of the optical disc;

Page 12, paragraph beginning at line 8, is amended as follows:

FIG. 12 schematically [explains the developed state] illustrates the configuration of the main constituents of another optical head, which can be applied to the optical head shown in FIGS. 1A, 1B, 2 to 6, 9A and 9B;

Page 15, paragraph beginning at line 10, is amended as follows:

On the other hand, a second IOU 20 for DVD is arranged in a predetermined position within the open portion 102 of the base 101 in a direction substantially perpendicular to the line joining the laser diode 11 of the IOU 10, the light detector 12 and the beam splitter 14. The second IOU 20 has a laser diode 21 emitting a laser beam having a second wavelength, which can be applied to an optical disc of a DVD type, and a light detector 22 formed [integral] integrally with the laser diode 21. The laser beam of the second wavelength emitted from the laser diode 21 is reflected from the optical disc and the reflected second laser beam is received by the light detector 22.

Page 17, paragraph beginning at line 6, is amended as follows:

The format of the CD type is capable of application to a CD-R and a CD-RW capable of recording. Where CD-R or CD-RW is mounted, the laser beam for CD permits recording data by changing the structure of the recording surface to cause the reflected light to have two different [levels] intensities.

Page 17, paragraph beginning at line 27, is amended as follows:

If the optical disc D conforms with [the] DVD standards, the laser beam collected on the recording surface is reflected by the recording surface of the optical disc D so as to be brought back to the objective lens 13. The laser beam is then converted into a parallel light by the objective lens 13 and, then, further reflected by the mirror block 16 so as to be brought back to the beam splitter 14. The reflected laser beam that is brought back to the beam splitter 14 is reflected toward the IOU 20 for DVD by the function of the dichroic film of the beam splitter 14.

Page 18, paragraph beginning at line 11, is amended as follows:

The reflected laser beam guided to the IOU 20 for DVD is received by the light detector 22 of the IOU 20 for DVD so as to be converted into an electric signal. Then, the electric is processed in a signal processing circuit shown in, for example, FIG. 17, so as to be converted into an RF signal (reproduction signal), a focus error signal and a tracking error signal. These converted signals are output. Incidentally, the RF signal is output from the optical head so as to be reproduced as a data signal by a digital signal processing circuit (not

shown) within the optical disc apparatus. On the other hand, the focus error signal and the tracking error signal are utilized for the known focus control for aligning the distance between the position of the objective lens 13 and the recording surface of the optical disc D with the focus point of the objective lens 13 and for the known tracking control for aligning the center of the laser beam passing through a predetermined position of the objective lens 13 so as to be collected on the recording surface of the optical disc D with the center of the pit column formed on the recording surface.

Page 20, paragraph beginning at line 6, is amended as follows:

The reflected laser beam guided to the light detector 12 included in the IOU 10 for CD is converted into an electric signal by the light detector 12 and, then, processed by the signal processing circuit shown in, for example, FIG. 17, so as to generate predetermined electric signals capable of forming an RF signal (reproduction signal), a focus error signal and a tracking error signal.

Page 21, paragraph beginning at line 11, is amended as follows:

As described above, the optical head 100 shown in FIGS. 1A and 1B is capable of coping with discs of different formats, and, thus, is [featured in] configured so that a plurality of optical systems such as IOU are housed in a single base 101. Therefore, when the head is miniaturized, the layout of the parts housed within the optical head 100 is restricted.

Page 21, paragraph beginning at line 18, is amended as follows:

In the optical head 100, the open portion 102 in which the optical path is arranged is increased with an increase in the optical path. The open portion is a relatively large space within the optical head 100, and [members] components other than [the optical path and] the optical [members] components forming the optical path are not [formed] disposed in the open portion.

Page 21, paragraph beginning at line 25, is amended as follows:

Under the circumstances, in the optical head 100 shown in FIGS. 1A and 1B, [attentions are] attention is paid to the space in which is arranged the optical path of the laser beam ranging between the laser diode 11 and the objective lens 13, and members for controlling the data recording in and data reproduction from the optical disc D are arranged appropriately in the open portion 102, in which the optical path is arranged, of the optical head 100.

Page 23, paragraph beginning at line 16, is amended as follows:

Also, in the optical head 100 shown in FIGS. 1A and 1B, the laser beam emitted from the laser diode 11 of the IOU 10 for CD is gradually diverged along the optical path. In other words, the laser beam has a small diameter on the emitting side near the light source. Therefore, relatively large members can be arranged if the monitor light detector 17, the laser driving circuit member 18, the actuator driver or the signal processing circuit [is] are arranged in the space on the emitting side of the open portion 102 near the light source.

Page 30, paragraph beginning at line 26, is amended as follows:

On the other hand, the monitor light detector 202 is mounted to the flexible printed circuit board 206 and is fixed to the base 216. Incidentally, as shown in FIG. 6, the laser driving circuit 217 and the monitor light detector 202 are arranged in parallel to the laser beam Bm and held so as not to interfere with the optical path of the laser beam Bm. In the optical head 200 shown in FIGS. 2 to 6, the laser driving circuit 217 and the monitor light detector 202 are arranged in parallel along the optical path ranging between the IOU 211 for DVD and the collimator 210. However, [these] the laser driving circuit 217 and the monitor light detector 202 may be arranged anywhere desired as far as [these] the laser driving circuit 217 and the monitor light detector 202 extend in parallel to the optical path of the laser beam ranging between the laser diode and the objective lens.

Page 32, paragraph beginning at line 2, is amended as follows:

As described above, in the optical head shown in FIGS. 2 to 6, the monitor light detector 202 is arranged above the beam splitter 208 and the laser driving circuit 217 is arranged below the beam splitter 208. It follows that [these] the monitor light detector 202 and the laser driving circuit 217 do not interfere with the laser beam Bm in the upper and lower portions of the beam splitter 208.

Page 35, paragraph beginning at line 22, is amended as follows:

As described above, the laser driving circuit member 18 is arranged in the vicinity of the IOU 10 for CD and within the space formed between the inclined portion of the optical path on the emitting position of the diverging laser beam Bm and the floor portion of the base 111 on the side away from the optical disc D with the optical path interposed therebetween, [in also] as illustrated by the optical head shown in FIGS. 9A and 9B.

Page 36, paragraph beginning at line 20, is amended as follows:

FIG. 11 schematically shows in a dismantled fashion the main constituents of the optical head that can be utilized in any of the optical heads described with reference to FIGS. 1A and 1B, FIGS. 2 to 6, and FIGS. 9A and 9B.

Page 42, paragraph beginning at line 14, is amended as follows:

FIG. 13A is a graph showing the relationships between the optical magnification and the light utilization and between the optical magnification and the power of the laser beam emitted from the objective lens in the case of using the optical head shown in FIG. 11. It is clearly seen that [each of] both the light utilization [denoted], graphed by curve "a_1" and the power of the laser beam emitted from the objective lens, which is [denoted] graphed by curve "b," [is decreased] decrease with an increase in the optical magnification. Also, as apparent from the Gaussian distribution shown in FIG. 13B, the light utilization is improved with a decrease in the optical magnification so as to increase the emitting power of the objective lens. If the optical magnification is made unduly small, however, the beam loading rate is lowered and other factors are increased. For example, the influence of the aberration in the optical path represented by the astigmatism is increased. As a result, the quality of the beam spot collected on the recording surface of the optical disc is lowered. When it comes to the transmittance of the laser beam, the number of optical members arranged in the optical path in the case of the DVD/CD common use is larger than that in the case of the optical system used exclusively for the CD, leading to reduction in the transmittance of light in the optical path. Under the circumstances, the optical magnification for the CD system is finally set at 4 in the optical head 400 shown in FIG. 11.

Page 49, paragraph beginning at line 18, is amended as follows:

On the other hand, the diverging angle of the laser beam for CD having a wavelength of 780 nm, which is emitted from the laser diode 561, is limited to a predetermined angle by the coupling lens 562 so as to be incident on the prism beam splitter 571 equipped with the wavelength selecting film 572. The laser beam for the CD disc having a wavelength of 780 nm, which is incident on the prism beam splitter 571, is reflected by the wavelength selecting film 572 and the reflected laser beam passes through the collimator 573 and the dichroic filter 574 so as to be incident on the objective lens 575.

IN THE CLAIMS:

Please amend the claims as follows:

1. (Amended) An optical head device comprising:

a light source for emitting a light beam having a predetermined wavelength;

a [laser] light source driving circuit [member] for driving [the] said light source for allowing [the] said light source to emit [the] said light beam;

a monitor light [detecting part] detector for detecting the light amount of [the] said light beam emitted from [the] said light source;

an objective lens for collecting the light beam on a predetermined position of [the] said optical disc;

a light [receiving element] receiver for receiving [the] said light beam reflected from [the] said optical disc and for converting the received light beam into an electric signal;

a base having an open portion and holding an optical component [member] arranged in the open portion for guiding [the] said light beam in a manner to form an optical path of [the] said light beam from [the] said light source to [the] said objective lens; and

a [holding member] holder for holding [the] said monitor light [detecting part] detector within the open portion of [the] said base in parallel to the optical path and in a manner not to interfere with [the] said light beam[;

a guide member for guiding the optical head in the radial direction of the optical disc; and

a disk motor for rotating the optical disk by predetermined speed].

2. (Amended) The optical head device according to claim 1, wherein

[the] said [holding member is] holder includes a cover [member] attached [on] to [the] said base for holding at least one of [the] said light source, [the laser] said light source driving circuit [member], [and the] said monitor light [detecting part] detector, [the] said objective lens, and said [the] light [receiving element and light receiving element] receiver.

3. (Amended) The optical head device according to claim 2, wherein [the] said base holds [the] said cover [member] with a predetermined clearance provided therebetween.

4. (Amended) The optical head device according to claim 3, wherein [the] said base permits a part of [the] said light source driving [part] circuit to be exposed to the outside through the clearance formed between [the] said cover [member] and [the] said base.

5. (Amended) An optical head used in an optical disc apparatus in which an optical disc is irradiated with a light beam for recording data in [the] said optical disc or for reproducing data from [the] said optical disc, at least one of a circuit component [member] and [part] element for reproducing or recording data being housed in [the] said optical head, comprising:

a light source for emitting a light beam having a predetermined wavelength;

an objective lens for collecting [the] said light beam for irradiating [the] said optical disc with [the] said light beam;

a driving mechanism [member] for moving the objective lens in a predetermined direction for at least one of a focusing and a tracking to the optical disc;

a light [receiving element] receiver for receiving [the] said light beam reflected from [the] said optical disc and for converting [the] said receiv[ed][ing] light beam into an electric signal;

a base having an open portion and holding an optical component [member] arranged in the open portion for guiding [the] said light beam in a manner to form an optical path of [the] said light beam from [the] said light source to [the] said objective lens;

a light source driving circuit [member which comprised] the light source driving circuit] for driving the light source;

a signal processing circuit [member which comprised the signal processing circuit] for processing the electric signal from [the] said light receiving element;

a driving mechanism driving circuit [member] for driving the driving mechanism; and

a [holding member] holder for holding at least one of [the been] said driving circuit [member], [the] said light source driving circuit [member], [the] said signal processing circuit [member], and [the] said driving mechanism driving circuit [member] within the open portion of [the] said base in parallel manner to [the] said optical path within [the] said base and in a manner not to interfere with [the] said optical path within [the] said base.

7. (Amended) The optical head according to claim 5, wherein [at least one of the] said driving mechanism driving circuit [member] has a yoke constituting a magnetic

circuit, and the [holding means] holder does not project beyond the height to which the yoke projects within the open portion of [the] said base.

10. (Amended) An optical head used in an optical disc apparatus in which an optical disc is irradiated with a light beam for reproducing data from the optical disc or for recording data in the optical disc, comprising:

an objective lens;

a light source emitting a light beam having a predetermined wavelength;

a light source driving part for driving the light source;

a base having an open portion and holding an objective lens and the light source within the open portion in a manner to define an optical path of a predetermined length; and

a cover [member] for holding the light source driving part in a position parallel to the optical path within the open portion so as not to interfere with the beam.

11. (Amended) The optical head according to claim 10, wherein [the] said base holds [the] said cover [member] with a predetermined clearance provided therebetween.

12. (Amended) The optical head according to claim 11, wherein [the] said base permits a part of [the] said light source driving part to be exposed to the outside through the clearance formed between the cover [member] and [the] said base.

13. (Amended) The optical head according to claim 11, wherein [the] said light source driving part is fixed to the cover [member] with a flexible printed circuit [member] interposed therebetween.